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many fanciful resemblances one sees in plants. We were lately quite provoked to find that Winthrop, with whom we certainly never had conversed, had hit upon an idea which we esteemed peculiarly our own. It was the comparison of the heads of timothy to cannon sponges. Many other curious similitudes have been observed, nor has man in his architectural and ornamental workmanship, begun to avail himself of one quarter of the lovely models at all times displayed before him.

If one makes a bouquet consisting alone of grasses, he will soon perceive how beautiful they really are. The panics and herd's grasses are especially lovely, both in the fields, which some of them tinge with their ruddy smoke, and in the vase at home, where their ethereal delicacy can be more closely noted.

The grasses are so numerous that it is impossible to refer even briefly to one quarter of them. We can only give our advice to "go and look them up."

CONTRIBUTIONS TO THE NATURAL HISTORY OF
THE VALLEY OF QUITO.—No. I.

BY PROFESSOR JAMES ORTON.

THE Geographical Distribution of organized beings is one of the unfinished chapters of natural history. Much has been done within the last twenty years in defining zoological and phytological provinces; but we are still very far from knowing the precise range of species. This has arisen partly from the failure of collectors to give exact localities, and partly from the ignorance of home naturalists, who often confound places hundreds of miles distant. The vast collections of Fraser, *e. g.*, are of little use in determining distribution, as in many cases the indefinite habitat, "Andes of Ecuador," is given, which may mean the Pacific slope, the head-waters of the Amazon, or the Quito Valley—three regions quite distinct in physical aspect.* On the other hand, those who determined his specimens have in some cases located them indiscrimi-

*The term *Andes* strictly belongs to the Eastern range, and *Cordillera* to the western; but this distinction is not always observed.

nately on either side of the Andes, from an ignorance of the geography of the country. Our generalizations lose half their value from this want of care and precision. "Could we only know the range of a single animal as accurately as Alphonse De Candolle has lately determined that of many species of plants, we might begin a new era in Zoology. It is greatly to be regretted that in most works, containing the scientific results of explorations of distant countries, only new species are described, when the enumeration of those already known might have added invaluable information respecting their Geographical Distribution."*

The importance of every fact relating to the natural limits of animals and plants is felt in its bearing on the great question of the day—the origin of species. Whether "all the grand leading facts of geographical distribution are explicable on the theory of migration, together with subsequent modification and the multiplication of new forms,"† cannot be safely answered until we have more precise as well as more extensive knowledge of habitats. We should know more thoroughly the conditions which favor migration, as also the effect of barriers in preventing the spread of species, and "the narrowest limits within which animals of different types may be circumscribed."

The following contributions are based mainly on the writer's personal observations. So far as we know, no attempt has been made to form a synopsis of the life in the region described; and it is hoped that this list may serve as the foundation of a more perfect work. The Valley of Quito is selected because it is a remarkably well-defined district, having a uniform temperate climate. It is nearly three hundred and fifty miles in length, stretching from 1° N. to 4° S., and has an average width of forty miles, being walled in by the grandest group of volcanic mountains in the world. These barriers have an average elevation of 12,000 feet above the sea, and are broken at few points, chiefly by the narrow gorges of the Santiago and Pastassa, and the sources of the Mira and Esmeraldos. The valley is subdivided by ridges into three basins—Quito, Ambato and Cuenca, having the respective altitudes of 9500, 8000 and 7500 feet, and mean temperature of 59°, 61° and 62°. At Quito the thermometric range in twenty-four hours is

* Agassiz, *Essay on Classification*, p. 35.

† Darwin, *Origin of Species*, p. 355.

about 10° ; and the extremes in a year are 45° and 70° . The mean annual fall of rain is 70 inches.

The region belongs to Sclater's "Neotropical"; more particularly, it is the northern part of Schmarda's subdivision—"the country of llamas and condors." When we have full returns, it will be interesting to compare life in the Quito Valley with the nature and relative proportion of inhabitants in oceanic islands. Darwin has pointed out the important lessons which may be learned from the natural history of the latter; and the study of isolated mountain districts is of nearly equal value. It is certainly of interest to ascertain whether the organic productions of the Andean Valley, like the endemic forms of the Galapagos Is., have a special adaptability for migration. The proportion of species to genera in islands is smaller than in continents; how in this respect does Quito compare with Amazonia? The vertebrates of South America are remarkably restricted in their range: does this show that the continent has been lately split up into isolated districts?

MAMMALS.

Nearly all the quadrupeds seen in the Valley have been introduced from Europe, as the horse, ass (mule), ox,* goat, sheep (two, four and six-horned), hog, dog and cat. The horse, ox and dog flourish at the highest inhabited altitude, or 13,300 feet. Quito cats are no mousers; dogs are far superior. Six orders are represented by the indigenous forms; but the following list of species is very incomplete. Years of observation in every part of the valley, from Ibarra to Loja, and up to the snow-line are necessary to finish the work. The largest mammal is the llama, always domesticated. The equine and ovine races are fast superseding it. It is usually of a dark brown color; but one of pure white is occasionally seen. The llama is not taken, we believe, as high up as the Hacienda of Antisana. A deer (*Coassus rufus* F. Cuv.?) occurs particularly about Lake Sn. Pablo at the foot of Imbabura. The *Tapirus Roulini* Fisch., possibly visits the vicinity of Loja; but its proper place is on the eastern slope. Of carnivores, the only certified examples are the puma which fol-

*The prevailing colors of the cattle are white and liver-color. "I have often observed (writes an old English resident), that the cattle in general are much lighter-colored than in England; even black has a blue cast. I have never seen one that would be called jet black." The majority of dogs are white or light brown curs.

lows the deer into the valley, a large brown weasel with a light colored belly, and the skunk, *Thiosmus mesoleuca* Licht. (var. *Quitensis* Humb.?) called by the natives "zoro" or Indian fox. The last is of a grayish color with black longitudinal bars. "All the South American *Canidae* belong to the dogs" says Murray; but on the slope of Chimborazo we caught sight of an animal which had a very close resemblance to a true fox. The small black bear of the Cordilleras is not known to enter the valley. It does not exceed one hundred and sixty pounds in weight. Bats are not numerous, but there are doubtless several species. The only one we have examined appears to be a *Nycticejus*. The *Cavia cobaya* Schr. (domesticated) is wonderfully prolific. The "cuye del monte" of the natives is confined, we believe, to the warm western slope. It is four times as large as the common guinea-pig, and covered with a thin coat of long hair, mingled brown and black. We observed a hare, perhaps the *Lepus Brasiliensis* Linn., the only one determined from South America. The squirrels, which are not uncommon, are probably distinct from the *Sciurus aestuans* of Brazil. Compared with their number in other regions, mice (*Hesperomyinae*) may be considered rare: their scarcity may be due to the multiplication of the guinea-pigs. Of opossums we obtained two species; *Didelphys Azarae* Tern., and *D. philander* Linn.?

The palaeontology of the valley of Quito has not been fully developed; but enough is known to excite deep interest in the ancient life on the top of the Andes. At Alangasi, near Quito, a large mastodon tooth was found many years ago; but the most extensive mammiferous deposit is at Punin, seven miles southwest of Riobamba. The bones are imbedded in an uns'ratified cliff, four hundred feet high, of very compact silt or trachytic clay. They were evidently drifted to the spot and deposited (many of them in a broken state, and none in their proper relative positions) in horizontal layers along with recent shells. In 1867, the writer took out a large collection * which included vertebræ, patellæ and femur (solid!) of mastodons, adult and young; vertebræ, leg bones and upper and lower jaws of two horses, one of ordinary size, the other about as large as the ass; vertebræ, leg bones and ischium of a llama or some auchenia; metatarsal like and large

* Now in the Museum of Yale College. A collection, strikingly similar excepting the mastodon, has been recently found at Table Mountain, Tuolumne Co., California.

as those of the camel; leg bones, jaw and teeth of a deer; remains of an unknown ruminant; and a small, hollow bone resembling the tibia of a bird. We are surprised at the absence of hollow-horned Ruminants, Rodents and Edentates which abounded in the Pleistocene of the Atlantic side. "Undoubtedly [says Darwin], the climate of the Cordilleras must have been different when the mastodon inhabited it." We think, however, the great pachyderm would have had little difficulty in thriving at the present day at Quito, on the score of temperature or altitude. But the vegetation is hardly sufficient.

BIRDS.

The avi-fauna is better known; and the following catalogue is believed to be nearly complete. It does not include all the stragglers; and other residents may be added from Loja which has not been thoroughly explored. Introduced species, as geese and poultry, are of course omitted. Those marked (*) were not obtained by the writer but are added on good authority; such as are considered restricted to the valley are indicated by a dagger (†). The further known range of the migratory ones is also added.

Turdidae:	Calliste atricapilla Lafr.—New Granada, [Venezuela.]
* Turdus gigas Fras.—New Granada.	Dubusia teniata Boiss.—New Granada.
“ chiliguancio Lafr.—Peru.	Iridornis dubius Bp.—New Granada.
“ Swainsoni Cab.—From Greenland [to Peru.]	Psitospiza Rieffeli Boiss.—New Granada, [Peru.]
Hydrobatidae:	Buarremon assimilis Boiss.—New Granada.
Cinclus leconotus ScL.—New Grenada.	“ latiniuchus Du Bus.—Peru.
Trochilidae:	*
† Thryothorus euphrys ScL.	“ pallidinuchus Boiss.—New Gra-
†* “ mysticalis ScL.	[nada.]
Trochilodes solstitialis ScL.—Pacific slope?	*
† Cistothorus aquatorialis Lawr.	“ schistaceus Boiss.—New Gra-
† Cinnycerthia unirufrunea Lafr.	[nada.]
“ canifrons Lafr.—New Granada.	“ leucopterus Jard.—Nanegal.
Pteroptochidae:	Butthraupis Edwardsii Ell.—New Granada.
Triptorhinus orthonyx Lafr.—New Gra-	“ cucullata Jard.—New Granada.
Mniotiltidae:	“ chloronota ScL
Mniotilla varia Linn.—United States to [Peru.]	Chlosospingus atripennis Lafr.—New Gra-
Basileuterus nigricapillus Lafr.—Bolivia.	“ superciliaris Lafr.—New [Granada.]
“ coronatus Tsch.—Peru.	“ canigularis Lafr.—New [Granada.]
Setophaga ruficoronata Kaup.—New Gra-	Chlorochrysa calliparaea Tsch.—New Gra-
nada.	[nada, Peru.]
Dendroica Blackburniae Gm.—United [States to Peru.]	† Compsocoma cyanoptera Cab. “ notabilis Jard.
Hirundinidae:	†* “ sumptuosa Less.—Peru, Ven-
† Petrochelidon murina Cass.	[zuela.]
“ cyanoleuca Vieill.—Bolivia, [Chili, Brazil, Paraguay.]	“ victorini Lafr.—New Granada.
Coerebidae:	Diva vassori Boiss.—New Granada.
Diglossa aterrima Lafr.—New Granada.	Euphonia nigricollis Vieill.—New Gra-
“ humeralis Fras.—New Granada.	[nada, Venezuela, Brazil.]
“ Lafresnayi Boiss.—New Granada.	† Pœcilotraupis atricapilla Cab. “ lunulata Du Bus.—New [Granada, Peru.]
“ personata Fras.—New Granada.	Fringillidae:
“ simillis Lafr.—New Granada.	Catamblyrhynchus diadema Lafr.—New [Granada.]
Daenis pulcherrima ScL.—New Granada.	†* Catamenia avaloides Lafr. “ homochroa ScL.
† Oreonanthes Fraseri ScL.	* Chrysomitris ictericola Lich.
† Conirostrum Fraseri ScL.	“ Magellanicus Vieill.—United [States? South America.]
Tanagridae:	Tanagra Darwini Bp.—Peru.
Tanagra Darwini Bp.—Peru.	Pyrrhura astiva Gm.—Canada to equator.

* *Pheucticus aureoventris* Lafr.
 † " *chrysogaster* Less.
 * *Phrygilus alaudinus* Kitt.
 * " *ocularis* ScL.
 * " *unicolor* Lafr. et D'Orb.—Bolivia,
 [Chill.
Sicalis arvensis Kitt.—Chili.
Zonotrichia pileata Bodd.

Icteridae:
 * *Cassiculus leucorhamphus* Bp.—New Granada,
 [Granada.

* *Sturnella bellicosa* De Fil.

Corvidae:
Cyanocitta turcosa Bp.—New Granada,
 Dendrocopidae:
 * *Synallaxis Antisensis* ScL.
 " *elegans* ScL.—New Granada.
 † " *flammulata* Jard.
 †* *Cinclodes albiventris* ScL.
 †* " *excelsior* ScL.
Margarornis squamiger Lafr.—Bolivia.
 † *Ochetorhynchus excelsior* ScL.
Picolaptes lacrymiger Lafr.—New Granada,
 [Granada.

Pseudocolaptes *Boissonneaui* Lafr.—New Granada, Peru.

Formicariidae:
Grallaria hypoleuca ScL.—New Granada.
 " *monticola* Lafr.—New Granada.
 * " *quitensis* Less.
 " *ruficapilla* Lafr.—New Granada.
 " *squamigera* Prev.—New Granada,
 [Granada.

Tyrannidae:
 †* *Aegithalos andicola* ScL.
 † " *solitaria* ScL.
 * *Elainia griseogularis* ScL.—New Granada,
 [Chili.
 * *Mecocerculus amoenus* ScL.
 " *stictoptera* ScL.—New Granada,
 [Chili.
 * *Muscisaxicola albifrons* Tsch.—Peru.
 * " *cinerascens* Phil.—Chili.
 * " *maculirostris* Lafr.—Bolivia,
 [Chile and Chill.
 † *Myiarchus nigriceps* ScL.
 * *Myioctius cinnamomeus* Lafr.—New Granada,
 [Granada, Bolivia.
 † *Myiothesetes erythropygius* ScL.
Myiozeta Guayanensis Cab.—New Granada.
Octhotea fumicolor ScL.—New Granada.
 " *fumigata* Boiss.—New Granada.
 " *Lessoni* ScL.—New Granada.
 † *Pyrocephalus manus* Gould.—Puna Is.,
 [Galapagos Is.
 * *Sayornis cineraceus* Lafr.—Venezuela.
Serpophaga cinerea Str.—New Granada,
 [Brazil.
 * " *parula* Kitt.—Bolivia, Chile,
 [Patagonia.

Cotingidae:
Amphelion arcuatus Lafr.—New Granada.
 " *rubrocristata* L. et D'O.—New
 [Granada, Bolivia.

Cotinga cincta Bodd.—Guiana, Brazil.
Pipreola melanoluma ScL.—Venezuela.
 " *Rieffeli* Boiss.—New Granada.

* *Tityra dorsalis* ScL.—New Granada.

Alcedinidae:
Ceryle torquata Linn.—Peru, Bolivia,
 [Brazil, Arg. Republic.

Galbulidae:
 * *Galbulia chalcothorax* ScL.—Napo?
 " *castanopectus*?—Brazil.

Trogonidae:
Trogon Antisianus D'Orb.—Napo? New
 [Granada.

* " *personatus* Gould.—New Granada,
 [Granada, Guiana.

Caprimulgidae:
Antrostomus nigrescens Cab.—New Granada,
 [Granada, Guiana.

Cypselidae:
Chatura rutila Vieill.—New Granada,
 Guatemala, Trinidad.

Trochilidae:
 † *Oreotrochilus Chimborazo* Bourc.
 † " *Pichinchana* Bourc.

* *Campylopterus aquatorialis* Gould.—Maran.
 Colibri *iolatus* Gould.—Peru, Bolivia.
Myrtis Faunus Less.—Peru.
Lafresnaya Gayi Bourc.—Peru.

Dociostaurus ensiferus Boiss.—New Granada,
 [Granada.

" *Schliephackei* Cab.—Nanegal.
Helianthea Lutetiae Delatt.—New Granada,
 [Granada.

Pterophanes Temminckii Bolss.—New Granada.
Aglaeactis cupripennis Bourc.—New Granada,
 [Granada.

Panoplitès flavescens Lodd.—New Granada,
 [Napo.

† *Rhamphomicron Herrani* Delatt.
 Stanleyi Bourc.

† " *microrhynchus* Boiss.—
 [New Granada, Upper Amazon.

† *Adelomyia maculata* Gould.
Metalurina tyrianthina Lodd.—New Granada,
 [Granada, Puna Is.

Lesbia amaryllis Bourc.—New Granada,
 [Peru, Puna Is.

† " *gracilis* Gould.
 † *Ortoni* Lawr.

Aceturra Heliodori Bourc.—New Granada,
 [Granada.

" *Mulsanti* Bourc.—New Granada,
 [Granada.

Chlorostilbon chrysogaster Bourc.—New Granada,
 [Granada, Pacific slope.

Patagona gigas Vieill.—Peru, Bolivia,
 [Chile.

† *Eriocnemis Luciani* Bourc.
 † " *nigrivestis* Bourc.

† " *squamata* Gould.

Cuculidae:
Coccyzus melanocephalus Vieill.—Upper Amazon, Guiana, Paraguay.

Capitonidae:
 * *Capito Bourcieri* Lafr.—New Granada.
 " *Hartlaubii* Lafr.—New Granada.

† *Tetraponops ramphastinus* Jard.

Picidae:
Colaptes elegans Fras.—New Granada.

Strigidae:
Strix punctatissima Gray.—Galapagos Is.

* *Bubo crassirostris* P. et L.—Chile.

Glaucidium infuscata Tem.—Brazil, Guat.
 [emala?

* *Speotyto cunicularia* Mol.—Brazil, Peru,
 [Chile.

Syrnium albogulare Cass.—New Granada,
 [Mexico.

Falconidae:
 † *Milvago carunculatus* Des Murs.
Polyborus Auduboni Cass.—Texas to Mexico,
 [Gellan Sts.

Craxirex unicinctus Tem.—Southern U.
 [S. to Arg. Repub.

Geranoaetus melanoleucus Vieill.—The Andes.

Hypotriorchis columbarius Linn.—New
 [Granada, North America.

Tinunculus sparverius Linn.—Brazil,
 [Guiana, North America.

Accipiter erythrocemius Gray.—Bolivia,
 [Brazil.

† " *nigroplumbeus* Lawr.

Circus cinereus Vieill.

Vulturidae:
Sarcocampus gryphus Linn. †—Andes.

* *Catharista atrata* Bartr.—Tropical America,
 [ica, Chili.

† Unless we are much mistaken, there is another species of *Sarcocampus* on the Andes a yet undescribed. See Proc. Am. Assoc. Sci. 1870, p. 194.

Columbidae:

- * *Chamaepelia gravatava* Bp.—New Granada.
- * *Chloroenas albilinea* Bp.—New Granada, [Costa Rica.]
- * *Columbula cruziana* Lafr.

Penelopidae:

- † *Zenaidura hypoleuca* Bp.
- * *Ornithida Montagnii* Bp.
- * *Crax (globulosa* Spix?)—Upper Amazon.
- Chamaepetes Goudotii* Less.—New Granada.

Tinamidae:

- * *Rhynchorhynchus perdix* Mol.

Charadriidae:

- Vanellus resplendens* Tsch.—Peru.

Chionidae:

- †* *Attagis Chimborazensis* ScL.

Scolopacidae:

- * *Tringa maculata* Vieill.—North America.
- * *Tringoides macularius* Linn.—N. A., Europe.
- * *Gambetta melanoleuca* Gm.—U. S., Central America.
- “ *flavipes* Bp.—North America.
- Totanus solitarius* Aud.—North America.
- Gallinago nobilis* ScL.

Ardeidae:

- Nyctiardea Gardeni* Baird.—U. S. to Peru.

Rallidae:

- Rallus Virginianus* Linn.—North America.

- * *Fulica Chilensis* Des Mu.—Peru, Bolivia.

Attilidae:

- * *Querquedula discors* Linn.—United States.

- * *Anas inoschata* Linn.—Brazil.

Colymbidae:

- Podiceps occipitalis* Less.—Chili, Magellan [St. S.].

This list gives one hundred and eighty-four species, of which thirty-eight are believed to be confined to the Valley.* The In-sessores number one hundred and sixty-nine, hummers, tanagers and fly-catchers predominating. The one hundred and eighty-four species represent one hundred and twenty-five genera: Southern New England (Mass., Conn. and R. I.) with the same area contains two hundred and forty-two species in one hundred and sixty-three genera; Ceylon, nearly twice as large as the Valley, has over three hundred and twenty species in two hundred genera. The relative proportion is not very different. The majority of the Quito birds have a northern stamp. About eighty species range north of Quito, chiefly in New Granada; of these, twenty-one are found in North America. About twenty-five species range south into Peru, Bolivia and Chile; while very few indeed are found on the Pacific or Brazilian slope. This accords with that “rule of high generality” that the inhabitants of an area are much more nearly related to those of the nearest source whence immigrants might have come. The birds of the Quito Valley have a more extensive latitudinal than horizontal range.

As a general rule the highland species are larger than the same residing in the lower altitudes. Thus, *Buthraupis cucullata*, *Ancestrura Mulsanti* and *Metallura tyrianthina* of Quito are much larger than those of Bogota. So the *Patagona gigas* is larger in Ecuador than in Chile; and the *Chaetura rufa* of Quito eclipses the same species in Guatemala. The *Euphonia nigricollis* of Brazil, however, seems to be larger than that of the Andes. The

* Many specimens are reported from Quito which in fact come from Nanegal or the Napo region. Thus, *Andigena laminirostris*, *Bourcieria fulgidigula* and *Peristera melanoptera* are from the west side, and *Tanagra caelestis* from the east. It is doubtful if either species of *Dociostaurus* enters far into the Valley. The Trogons and Jacamars are also accidental.

birds of the high Valley are essentially aerial; they show a greater development of wings over legs; climbers, scratchers, runners, waders and swimmers are few. There is less brilliant plumage than in lower, warmer altitudes. Green and brown are the prevailing colors. Even the hummers are surpassed by those on the Pacific slope, in the Valley of the Magdalena and along the coast to Rio. All of the Trochilidæ belong to the group Polytminæ; the "Hermit" hummers keep to the dense forests. Leaving out the *Docimaster* (which properly belong to Nanegal on the west slope), the average length of the bills of Quitonian hummers is three-fourths of an inch. Their nests are covered with moss; never with lichens. The finches nidify in October; the condors in February; the hummers in April.

THE GENUS HYSTERIUM AND SOME OF ITS ALLIES.

BY DR. J. S. BILLINGS, U.S.A.

My purpose in the following paper is to enable those who are commencing the study of mycology, but who have not access to authentic specimens and to the greatly scattered and often contradictory literature of the subject, to identify the common species of the genus *Hysterium* and its closely allied forms. My data for this purpose are derived from the examination of authentic specimens in the Schweinitz Herbarium, and in the herbarium of Mr. H. W. Ravenel of South Carolina; from specimens named by Rev. M. A. Curtis, and from the description and figures given by M. Duby in his "Mémoire sur la Tribu des Hystérinées," Geneva, 1861.

The genus *Hysterium* is one of the Ascomycetous forms of fungi characterized by the peculiar shape and mode of opening of its conceptacle or peritheciun,* which is either elliptical or longitudinal, opening by a slit or fissure running in the direction of its greatest length.

The species are found upon dead wood, bark, leaves and stems

*For explanation, with figures, of the parts of fungi, see NATURALIST, vol. iv. p. 667-674.